



# HLA OMT Fundamentals



**Integrated Training Program**

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# Background



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- **The formal definition of the HLA is composed of:**
  - **HLA Rules:** A set of rules which must be followed to achieve proper interaction of simulations in a federation execution. These describe the responsibilities of simulations and of the runtime infrastructure (RTI) in HLA federations.
  - **HLA Interface Specification:** Definition of the interface functions between the RTI and simulations participating in HLA federations.
  - **HLA Object Model Template:** Common presentation format for HLA Object Models.

# Object Models



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- **Object models provide an identification of the set of objects chosen to represent the “real world” for a specific application, including:**
  - **Object characteristics (attributes)**
  - **Static object relationships (class hierarchies, associations, aggregations)**
  - **Dynamic object relationships (interactions)**
  - **Individual object behavior**

**\*Note: HLA Object View does not imply or require object-oriented implementation means**

# HLA Object Models



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**Federation Object Model (FOM):** a specification of the exchange of public data among the participants in a HLA federation

- **Required information**
  - **Object Classes**
  - **Object Interactions**
  - **Attributes/Parameters**
  - **Lexicon**
- **Optional Information**
  - **Object Associations**
  - **Composition Relationships**
  - **Object Model Metadata**

# HLA Object Models



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**Simulation Object Model (SOM): a specification of the capabilities offered to federations by individual simulations**

- **Same information categories as FOM**
- **Provides “logical” representation of imported and exported data**
- **Provides means of judging suitability of simulation systems to participate in HLA federations**
  - **Facilitated by automated browsing tools (in future) and current data standardization efforts**



# HLA Object Model Template



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**The HLA OMT is a standardized presentation format for describing HLA object models**

- **Rationale:**

- **Facilitates FOM development coordination**
- **Provides a common means of describing potential federation members**
- **Facilitates the design and development of common FOM development toolsets**

# OMT Components



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- **Object Class Structure Table**
- **Object Interaction Table**
- **Attribute/Parameter Table**
  - **Enumerated Datatype Table**
  - **Complex Datatype Table**
- **FOM/SOM Lexicon**

# Object Class Structure Table



Object Class Structure Table			
<class> (<ps>)	[<class> (<ps>)]	[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]*   [<ref>]
		[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]*   [<ref>]
		...	...
	[<class> (<ps>)]	[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]*   [<ref>]
		[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]*   [<ref>]
		[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]*   [<ref>]
...	...	...	
<class> (<ps>)	[<class> (<ps>)]	[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]*   [<ref>]
		[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]*   [<ref>]
		...	...
...	...	...	...
Air Vehicle(S)	Fixed Wing (S)	Fighter-Attack (S)	F-14 (PS)
			F-16 (PS)
			F-18 (PS)
		Bomber (S)	B-1B (PS)
		B-2 (PS)	
	Rotary Wing (PS)		

# Object Interaction Table



Object Interaction Table							
Interaction Structure		Initiating Object		Receiving Object/Area		Interaction Parameters	Init/Sense/React
		Class	Affected Attributes	Class	Affected Attributes		
<interaction>	<interaction>	<class> [,<class>]*	[<attribute> [,<attribute>]* [(<comment>)]*	[<class> [,<class>]*	[<attribute> [,<attribute>]* [(<comment>)]*	[<parameter> [,<parameter>]*	<isr>
	<interaction>	<class> [,<class>]*	[<attribute> [,<attribute>]* [(<comment>)]*	[<class> [,<class>]*	[<attribute> [,<attribute>]* [(<comment>)]*	[<parameter> [,<parameter>]*	<isr>
	...	...	...	...	...	...	...
<interaction>	<interaction>	<class> [,<class>]*	[<attribute> [,<attribute>]* [(<comment>)]*	[<class> [,<class>]*	[<attribute> [,<attribute>]* [(<comment>)]*	[<parameter> [,<parameter>]*	<isr>
...	...	...	...	...	...	...	...
Weapon Detonate	Weapon Denotate at Air Target	Weapon	Velocity, Acceleration, Weight, ⋮	Air Vehicle	VelocityWeapon AccelerationWarhead, Weight, Weapon ⋮	Location, Attitude, ⋮	IR
	Weapon Denotate at Ground Target	...	...	...	...	...	...

# Attribute/Parameter Table



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Object/ Interaction	Attribute/ Parameter	Data Type	Cardi- nality	Units	Resolution	Accuracy	Accuracy Condition	Update Type	Update Condition	T/A	U/R
<class>   <Interaction>	<attribute>  <parameter>	<datatype>	[<size>]	<units>	<resolution>	<accuracy>	<condition>	<type>	<rate>   <condition>	<ta>	<ur>
	<attribute>  <parameter>	<datatype>	[<size>]	<units>	<resolution>	<accuracy>	<condition>	<type>	<rate>   <condition>	<ta>	<ur>
	...	...	[<size>]	...	...	...	...	...	...	...	...
<class>   <Interaction>	<attribute>  <parameter>	<datatype>	[<size>]	<units>	<resolution>	<accuracy>	<condition>	<type>	<rate>   <condition>	<ta>	<ur>
	<attribute>  <parameter>	<datatype>	[<size>]	<units>	<resolution>	<accuracy>	<condition>	<type>	<rate>   <condition>	<ta>	<ur>
	...	...	[<size>]	...	...	...	...	...	...	...	...
<class>   <Interaction>	<attribute>  <parameter>	<datatype>	[<size>]	<units>	<resolution>	<accuracy>	<condition>	<type>	<rate>   <condition>	<ta>	<ur>
...	...	...	[<size>]	...	...	...	...	...	...	...	...
Tank	Area	Float	1	m2	0.1 m2	perfect	always	conditional	scen events	TA	UR
	Velocity	Double	1	m/sec	1 m/sec	.01 m/sec	none	periodic	10 Hz	TA	UR
	State	Tank_Type	1	n/a	n/a	n/a	n/a	conditional	scen events	TA	UR
	Position	Rectng_Type	1	n/a	n/a	n/a	n/a	periodic	10 Hz	TA	UR
Weapon Detonate	Warhead	Wh_Type	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

# OM Development Process



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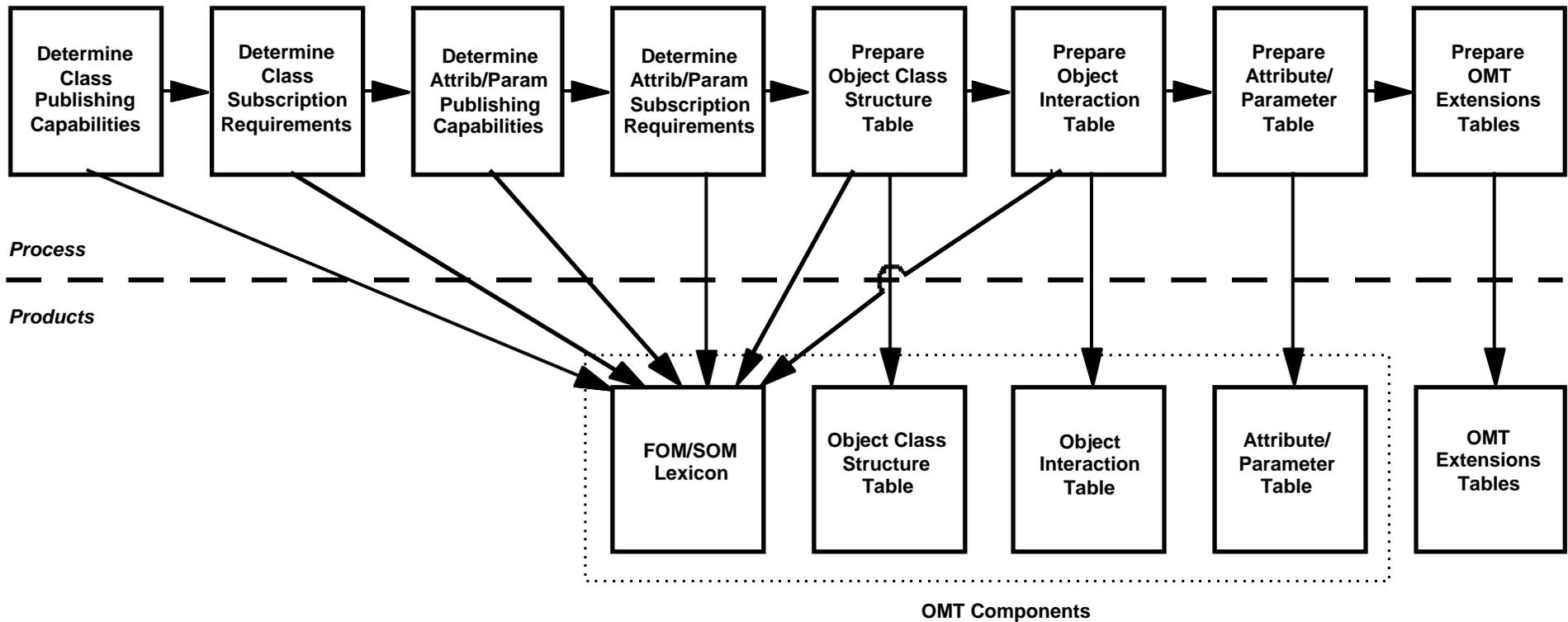
## General Observations

- There are many potential processes which can lead to successful development of HLA object models
- Current process model driven by HLA protofederation experiences
- Object models facilitate, but do not by themselves guarantee, interoperability
- A process model for HLA object model development must evolve with supporting standards and infrastructure

# SOM Development Process



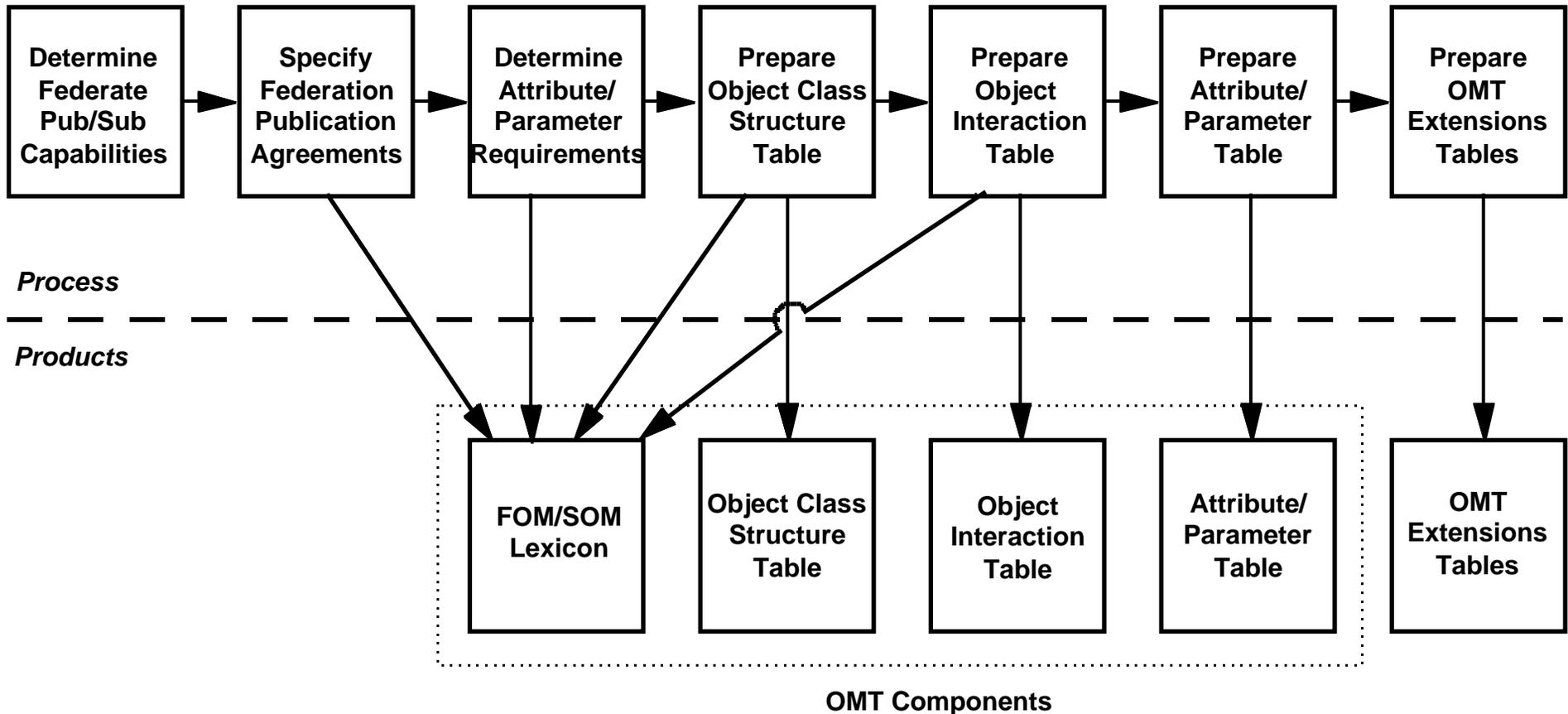
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# FOM Development Process



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# Related Documents



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- **OMT Extensions:** template for describing optional classes of information for HLA object models.
- **FEDEP Model:** a description of the process used to build and execute HLA federations.

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